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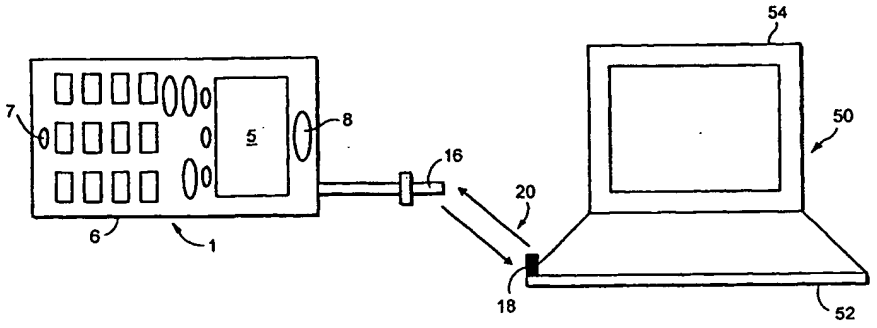

(57) Abstract

A portable communication terminal comprising a user interface, a radio transceiver for communicating with a telecommunication network and a low power radio frequency (RF) transceiver by which a low power radio frequency (RF) communication link can be established with a local terminal, wherein, in response to a user input via the user interface, the portable terminal monitors signals received by the low power radio frequency (RF) transceiver with a view to establishing the low power radio frequency (RF) link.

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PORTABLE COMMUNICATION TERMINAL

The present invention relates to a portable communication terminal.

As technology advances, it is becoming more and more usual for devices to communicate with each other. For instance, a radiotelephone may act as a gateway to the public telephone switching network (PTSN) for a local data terminal such as, for example, a PC, a laptop PC, a personal organiser, a smart phone, a personal digital assistant (PDA), a printer, a facsimile machine and the like. Interfacing between the such devices may be accomplished via a low power radio frequency (RF) link. Such interfaces may be provided between almost any digital device e.g. computers, phones, scanners, cameras, headsets, keyboards, joysticks etc.

Such low power radio frequency links are the focus of the "Bluetooth" initiative of major telecommunications players launched in May 1998. Further discussion of this initiative can be found on pages 26-27 of "Mobile Communications International" September 1998. On the road, this technology would allow notebook users to use a smart phone as a modem to dial in to a corporate network. Within an office, the technology could be used in network hubs to keep users connected to the network as they move about the corporation. It would also allow users to synchronise personal data, such as an address book, between a PDA and a PC.

Low power radio frequency (RF) transmission envisages a power of the order of 1mW (or 0 dB) for operation over distances in the range of 10cm to 30 meters. Currents of around 8 to 30mA at a voltage around 2.7V are contemplated. Data rates of around 1Mbps are envisaged for communication between devices such as hand-held computers, notebooks and cellular

phones. The frequency used in such scenarios is envisaged to be around 2.4 GHz.

The present invention has particular, but not exclusive, application to the management of the low power radio frequency (RF) link in the above and similar circumstances.

With this in mind, in one aspect the present invention provides a terminal comprising a user interface, a radio transceiver for communicating with a telecommunication network, and a low power radio frequency (RF) transceiver by which a low power radio frequency (RF) communication link can be established with a local terminal, wherein, in response to a user input via the user interface, the terminal monitors signals received by the low power radio frequency (RF) transceiver with a view to establishing the low power radio frequency (RF) link.

By limiting the occasions when the portable communication terminal seeks to establish the low power radio frequency (RF) link only to those occasions when a user input indicates that the user is requesting that the low power radio frequency (RF) link is established, power savings resulting from reduced use of the low power radio frequency (RF) transceiver can be achieved.

Preferably, if no low power radio frequency (RF) link is established within a predetermined interval, for example 20 seconds, the monitoring activity of the low power radio frequency (RF) transceiver is discontinued. By limiting the monitoring activity in this way, further power savings can be achieved in circumstances where for some reason it has not been possible to establish the low power radio frequency (RF) link within a reasonable period.

In another aspect, the present invention provides a method of communicating between two terminals via a low power radio frequency (RF) link in which at least one of the terminals monitors for low power radio frequency (RF) activity in response to a user input via its user interface.

In a further aspect, the present invention provides a terminal comprising a user interface and a low power radio frequency (RF) transceiver by which a low power radio frequency (RF) communication link can be established with a local terminal, wherein, in response to a user input via the user interface, the terminal monitors signals received by the low power radio frequency (RF) transceiver with a view to establishing the low power radio frequency (RF) link.

Exemplary embodiments of the invention are hereinafter described with reference to the accompanying drawings, in which:

Figure 1 shows a perspective view of a terminal according to the invention;

Figure 2 shows a diagram of the main features in the terminal of Figure 1; and

Figure 3 shows a diagram of the terminal of Figure 1 establishing a low power radio frequency (RF) link with a PC.

The terminal shown in Figure 1 is a cellular mobile telephone 1 having an 'A' or front cover 3a and a 'B' or rear cover 3b powered by a rechargeable battery pack 2. The user interface of the telephone 1 comprises a liquid crystal display 5 having backlighting, a microphone 7, a loudspeaker 8 and a keypad 6. The keypad 6 comprises two groups of keys: a first group of alphanumeric keys 6a for entering telephone numbers and text data, and a second group of

functions keys 6b for enabling/disabling functions of the telephone 1 or causing operations of the telephone 1 to be executed.

Referring to Figure 2, the telephone includes a transceiver 9 for transmitting and receiving signals to and from a cellular telecommunication network. A controller 4 in the form of a microprocessor controls the operation of the telephone 1 including its user-interface, a memory 14, the radio transceiver 9 and a low power radio frequency (RF) transceiver 16 (not visible in the Figure 1 view).

One of the function keys 66, the ON/OFF key, can be depressed for a relatively long duration (>1 second) to cause the controller 4 to switch the telephone 1 between an off mode in which negligible battery power is consumed to an on mode. In an on mode, the telephone 1 can be considered to be in any one of a call processing mode, an active standby mode or a passive standby mode.

In the call processing mode, a telephone call is conducted over the (radio) air interface via the radio transceiver 9. Due to heavy use of the air interface during calls, this mode results in high power consumption.

In active standby mode, power is consumed as a result of certain user-interface functions of the telephone 1 and the radio transceiver 9. In passive standby mode, power is consumed substantially only as a result of the radio transceiver 9. In either kind of standby mode, the power consumption of the radio transceiver 9 arises out of the need to access the air interface to maintain registration with the cellular network, specifically, for example, to watch for incoming calls and hand over from one cell to another as the telephone 1 changes location, even though no calls traffic is being processed. The difference between the two standby modes lies in the fact that in active

standby mode, the user is able to make use of the keypad 6 and the display 5 in order to review or alter the contents of the memory 14, for example, with a view to adding a number to the telephone number store or altering a control setting of the telephone 1. In this active standby mode, the backlighting of the display 5 is activated. In order to move between the active standby mode and the passive standby mode, the keys MENU and * are pressed sequentially. In passive standby mode, the display 5 and its backlighting are inactive as is the keypad (except, of course, in response to the sequential pressing of the MENU and * keys). While in passive standby mode, if an incoming call is received, then depression of any key accepts the call and thus the telephone 1 enters the call processing mode.

Figure 3 shows the telephone 1 and a local data terminal in the form of a PC 50. The PC comprises a keyboard 52, a cathode ray visual display 54 and a low power radio frequency (RF) transceiver 18. In order to send a facsimile document prepared on the PC 50 using the telephone 1 as a gateway to the PTSN, the data defining the facsimile needs to be transferred to the telephone 1 via their respective low power radio frequency (RF) transceivers 16,18.

The PC 50 and the telephone 1 are arranged such that their low power radio frequency (RF) transceivers 16, 18 are in range of each other. Initially, the telephone 1 is in passive standby mode. On sequentially pressing the MENU and * keys, the telephone 1 switches from passive standby mode to active standby mode. Also, the low power radio frequency (RF) transceiver 16 of the telephone 1 starts to monitor or poll for incoming low power radio frequency (RF) signals with a view to establishing a low power radio frequency (RF) link (20) between the telephone 1 and the PC 50. If during a 20 second period, the PC 50 transmits signals which seek to create a low power radio frequency (RF) link, then a low power radio frequency (RF) link is established permitting the facsimile document data to be transmitted. If, however, after the 20

second period, no link is established then the telephone 1 discontinues monitoring the incoming low power radio frequency (RF) signals. It will thus be appreciated that the functional effect of sequentially pressing the MENU and * keys is two fold, firstly, to switch the telephone 1 from passive standby to active standby mode, but also secondly to start the monitoring activity.

In other embodiments, the user input for the low power radio frequency (RF) transceiver 16 to start to monitor low power radio frequency (RF) activity can be actions which are dedicated to or have the sole functional effect of triggering the monitoring activity. Examples include the selection of an option from a menu, the depression of predetermined keys, either in a defined sequential order or simultaneously, or a voice command.

When the low power radio frequency (RF) transceiver 16 is not polling for low power radio frequency (RF) activity, it can be either 'on' but not consuming much power by virtue of not actively polling for low power radio frequency (RF) activity, or shut-down into a power-saving or standby mode where it uses negligible power.

In another embodiment, when the telephone 1 is in the off mode, the trigger to start monitoring low power radio frequency (RF) activity can be provided by depression of the ON/OFF key for a relatively short duration which is insufficient to place the telephone 1 into on mode. If during the 20 second interval, no low power radio frequency (RF) link is established then the monitoring activity is discontinued and the telephone 1 remains in off mode. On the other hand, if a low power radio frequency (RF) link is established, then the telephone 1 is switched to the on mode.

The terminal has been described with reference to a radiotelephone however the invention has application to many other devices e.g. printers etc. as set out in the initial paragraphs of this document.

CLAIMS

1. A portable communication terminal, comprising:
a user interface;
a radio transceiver for communicating with a telecommunication network; and
a low power radio frequency (RF) transceiver by which a low power radio frequency (RF) communication link can be established with a local terminal;
wherein, in response to a user input via the user interface, the terminal monitors signals received by the low power radio frequency (RF) transceiver with a view to establishing the low power radio frequency (RF) link.

2. A portable communication terminal as in Claim 1, wherein, if no low power radio frequency (RF) link is established within a predetermined interval, said monitoring is discontinued.

3. A portable communication terminal as in Claims 1 or 2, wherein the user input comprises the depression of predetermined keys.

4. A portable communication terminal as in any of Claims 1 to 3, wherein the user input comprises a voice command.

5. A portable communication terminal as in Claims 3 or 4, wherein the user input has the sole functional effect of triggering said monitoring.

6. A portable communication terminal as in Claims 3 or 4, wherein the user input has the functional effect of triggering said monitoring and changing the mode of operation of the portable terminal.

7. A terminal comprising a user interface and a low power radio frequency (RF) transceiver by which a low power radio frequency (RF) communication link can be established with a local terminal, wherein, in response to a user input via the user interface, the terminal monitors signals received by the low power radio frequency (RF) transceiver with a view to establishing the low power radio frequency (RF) link.

8. A portable communication terminal constructed, arranged and adapted to operate substantially as hereindescribed with reference to the accompanying drawings.

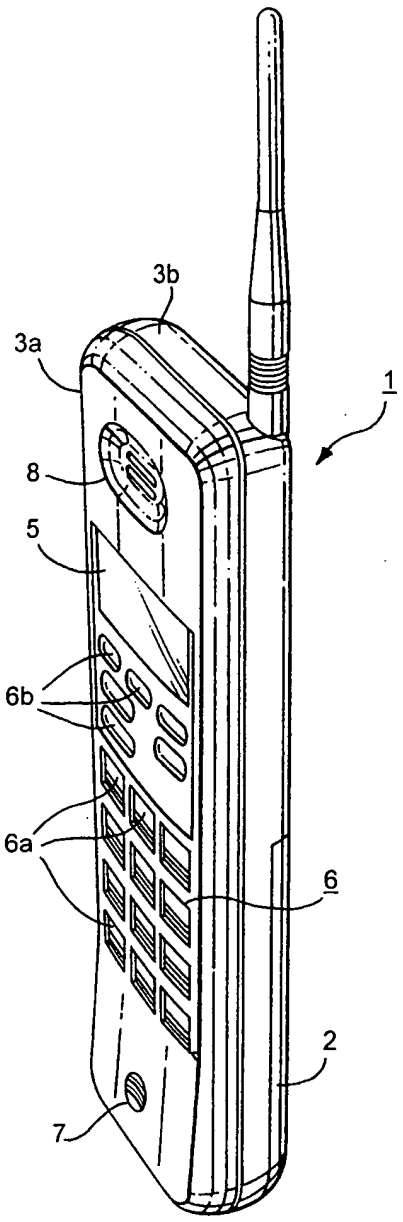

FIG. 1

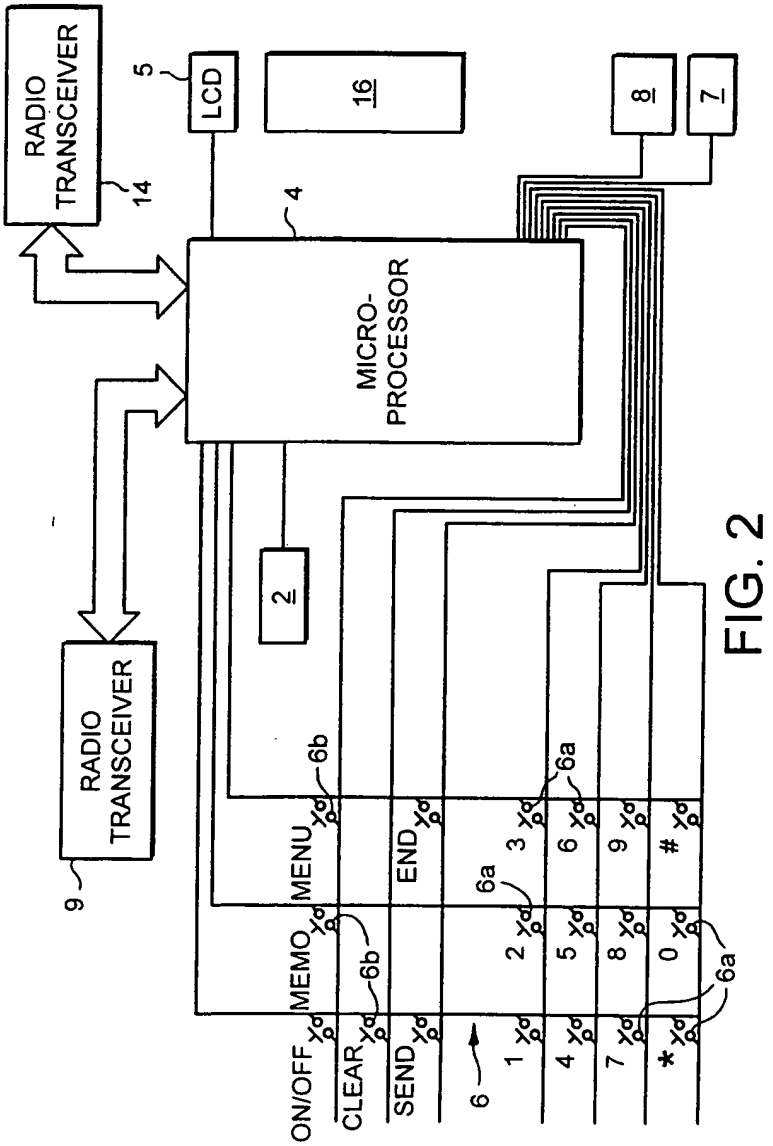
RADIO TRANSCEIVER
14
5
LCD
16
8
7
4
MICRO-PROCESSOR
2
RADIO TRANSCEIVER
9
6b
6a
MENU
END
3
6
9
#
6a
2
5
8
0
MEMO
6b
6a
ON/OFF
CLEAR
SEND
6
1
4
7
*

FIG. 2

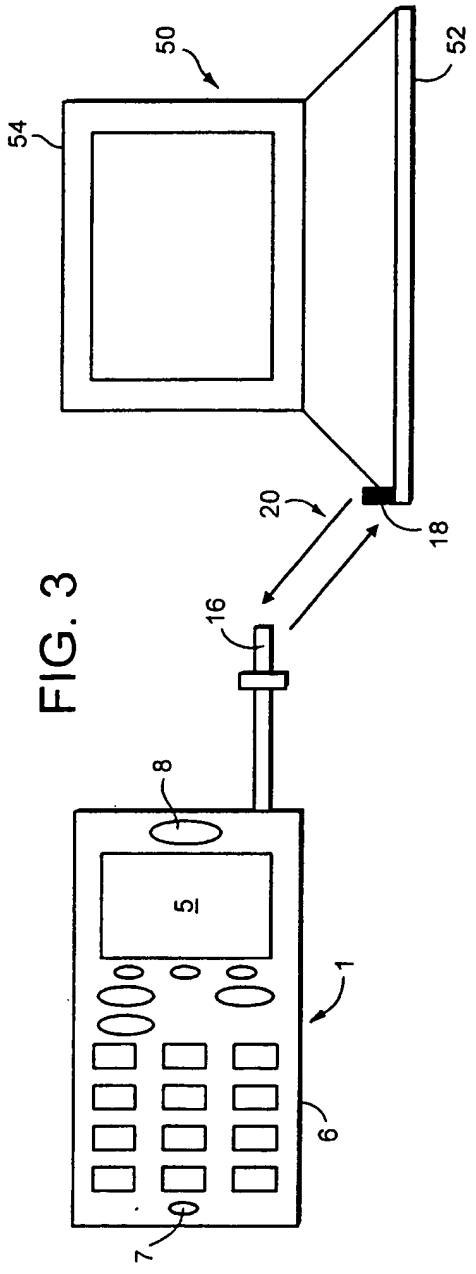

FIG. 3

INTERNATIONAL SEARCH REPORT

Internat. Application No
PCT/EP 99/07721

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04B1/16 H04B1/38 H04Q7/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04B H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 821 502 A (NOKIA MOBILE PHONES LTD) 28 January 1998 (1998-01-28)	8
A	abstract page 1, line 1 - line 12 page 5, line 44 - line 58 page 11, line 11 -page 13, line 35	1-3,5-7
P,X	WO 99 16280 A (ERICSSON GE MOBILE INC) 1 April 1999 (1999-04-01)	8
A	abstract page 4, line 3 -page 10, line 29 figure 2	1-3,5-7

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[X] Further documents are listed in the continuation of box C.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	HAARTSEN J: "BLUETOOTH - THE UNIVERSAL RADIO INTERFACE FOR AD HOC, WIRELESS CONNECTIVITY" ERICSSON REVIEW,SE,ERICSSON. STOCKHOLM, no. 3, 1 January 1998 (1998-01-01), page 110-117 XP000783249 ISSN: 0014-0171	8
A	the whole document	1,7

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Information on patent family members

Interna .al Application No
PCT/EP 99/07721

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0821502 A	28-01-1998	JP 10117184 A	06-05-1998
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